ORIGINAL ARTICLE

LAPAROSCOPIC SPLENECTOMY; SINGLE SURGEON, SINGLE CENTRE INITIAL EXPERIENCE AT TERTIARY LEVEL HOSPITAL IN PESHAWAR

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Background: Despite the fact that Laparoscopic splenectomy has become first choice for most cases of splenectomy in the developed world, open splenectomy is still being done in majority of the developing countries. There is no local data of our hospital on laparoscopic splenectomy. **Methods:** Cross sectional study of 103 patients with laparoscopic splenectomy from Feb, 2013 to Jan, 2018 done for benign conditions of spleen at Khyber Teaching Hospital, Peshawar. Consecutive non-probability sampling was done. Lateral approach was utilized. Patients' demographics, preoperative characteristics and intra / postoperative complications were collected on a *proforma*. **Results**: Mean age was (26) years. Two third (2/3) of patients were female. Major indication was ITP (Idiopathic Thrombocytopenic Purpura) followed by HS (Hereditary Spherocytosis). Total splenectomy was done in splenic cysts. In half of the cases, platelet and / or blood were transfused preoperatively as a measure of preoperative optimization. Intraoperative & postoperative complications occurred in (8%) which were managed conservatively. Conversion rate was (0%). Triple vaccination was done in almost all patients. **Conclusion**: Laparoscopic splenectomy is safe in experienced hands and should be the first choice in elective cases even in developing world. Local surgeons should train residents and junior surgeons to improve laparoscopic skills as training abroad is costly.

Keywords: Laparoscopic splenectomy; Idiopathic Thrombocytopenic Purpura; Laparoscopy; Splenectomy; Platelet transfusion; Platelet count

Citation: Khan MA, Kamran H, Ullah R, Zarin M. Laparoscopic splenectomy; single surgeon, single centre initial experience at tertiary level hospital in Peshawar. J Ayub Med Coll Abbottabad 2021;33(3):488–91.

INTRODUCTION

With the advancement of laparoscopy, most cases of elective splenectomy are now being done laparoscopically. Studies have shown that Laparoscopic splenectomy (LS) is safe and efficient with comparatively less complications and improved patient outcomes.[1]

There are very few absolute contraindications to LS which are uncorrected coagulopathy, comorbidities that preclude laparoscopy and hematologic malignancies that are not localized to the spleen.[2] Low platelet count is no more an absolute contraindication.[1] This is due to the fact that advances in laparoscopy and use of different energy devices minimizes bleeding and other complications.

In addition to the usual benefits of minimal invasive surgery, Machado NO et al pointed out a significant decrease in post-operative acute chest syndrome from 33.3 – 5.2% due laparoscopic splenectomy.[3] An important factor in patients of splenectomy is need for preoperative platelet transfusion which according to Vecchio R is 100% in open while 30% in laparoscopic splenectomy.[4]

In minimal invasive surgery, there is always a risk of conversion to open. One of the most common factors leading to conversion is intra-operative haemorrhage which can occur either due to injury to the vessels at splenic hilum or splenic capsule. As minimal invasive approach is more and more employed in emergency cases such as acute abdomen, there are few studies in the literature which describes laparoscopic approach for trauma patients. Although exploratory laparotomy is still considered the gold standard in trauma patients, there is added benefit of diagnosis of associated injuries through minimal invasive approach. Therefore, in certain conditions, this approach can be utilized.[5,6]

Another benefit of laparoscopic approach is that of concomitant cholecystectomy without the need for increasing the size of incision, though it is correlated with increase in operating time and morbidity.[1]

Systemic review of 27 articles carried out by Moris D showed that laparoscopic approach needs to be offered as gold standard to all the patients, although further high-quality research is needed to strengthen the evidence favouring laparoscopic approach.[1] By looking at the benefits of laparoscopy, it is no longer limited to the developed world. More experiences have been shared about advanced

laparoscopic surgeries being done in developing countries. We are sharing our experience of LS done at tertiary level hospital.

There is limited data on laparoscopic splenectomy in Pakistan. To the best of our knowledge, this is one of the first experience of this much patients shared by a local surgeon. We want to undertake this local study and compare our results with the national and international data in terms of intra-operative and early postoperative outcomes. This data will serve as baseline for our local surgeons and will improve upon it.

Objective of the study was to determine indications, frequency of preoperative blood / platelet transfusion and intra-operative & early post-operative outcomes following laparoscopic splenectomy.

Wound infection: Presence of any of the following two features observed post operatively till 4 weeks:

Temperature > 38 °C

Discharge from the wound

Signs of inflammation around the wound

Intra-operative bleeding: Blood loss of more than 800 ml was considered as significant intra-operative bleeding.

Ileus: Failure to pass flatus and absence of bowel sounds after 24 hours of surgery.

Pulmonary complication: Such as Atelectasis, Pneumonia. Presence of both (cough and temperature of > 38 °C).

Massive splenomegaly: A spleen palpable inferior and to the right of the umbilicus.

MATERIAL AND METHODS

This is our case series of 103 patients in which laparoscopic splenectomy was done for different benign indications at Khyber Teaching Hospital, Peshawar for 5 years, from Feb, 2013 to Jan, 2018. This is descriptive cross-sectional study. Sampling technique was consecutive non-probability. All patients of both gender and all ages who came to our Out-patient department in which elective splenectomy was indicated were admitted and included in the study after informed consent. Detailed work up of each patient was done. They were counselled about laparoscopic splenectomy. Those who refused to give consent for laparoscopic splenectomy, in which laparoscopy was absolutely contraindicated, those with massive splenomegaly and traumatic splenic injuries were excluded from the study. Most of the patients were being referred to our unit by physicians and other fellow surgeons for the procedure to be done laparoscopic.

Details including demographics, preoperative characteristics, and intra / post-operative variables were noted in the predesigned proforma. As per hospital protocols, triple vaccination (vaccination for *H. Influanza, Meningococcus* and *Strep. Pneumonia*) was recommended for every patient at least 2 weeks before the surgery. Postoperatively, patients were followed up at 1 week, 4 weeks and then at one year. This is the experience of a surgical team having more than 10 years' experience in advanced laparoscopy. Data was collected on pre-designed *pro forma.* The data was analysed by determining the frequency and relative frequency for nominal and ordinal data.

In most of our cases, we used right semi-lateral decubitus position and the patient is placed in reverse Trendelenburg position. This position is favoured by most of the surgeons. We flex the operating table at approximately 30 degrees. This is a good technique to increase working space between the costal margin and the iliac crest. The surgeon and camera operator stand on the patient's right side, and the assistant on the left. An open laparotomy tray is placed nearby in case of open conversion in emergency. We found verses needle very helpful in initial insufflation with the needle positioned medial to the anterior axillary line and inferior to the left costal margin. Another option is trocar insertion under camera guidance but we have never used this technique due to cost issues. The first port is positioned at the mid-clavicular line approximately 6 cm from the costal margin. Subsequent ports' placement varied with patient's body habitus and the size of the spleen. In majority of the patients, three 5 mm ports are placed parallel the costal margin, from just left of midline to the mid-axillary line, and a 12 mm port is placed inferior to the line connecting the first three ports and is used as optical port. The inferior pole of the spleen is mobilized with energy device by dividing the spleno-colic ligament and lateral attachments.

We found harmonic as a useful energy device for this dissection, greatly reducing operating time with good haemostasis. Dissection is then carried medial to lateral, thereby dividing the spleno-renal ligament along the length of the spleen, without opening the Gerota's fascia. Then, gastro-splenic ligament is divided which contains the short gastric vessels. With the assistant elevating and retracting the spleen, the splenic hilum is distinguished from the tail of the pancreas and hilar vessels are clipped using hemlock for larger vessels, and medium / large size Liga clips for relatively smaller vessels. In some situations, where we needed more security, suture ligation was used. The field is then inspected for haemostasis. We found it very cost effective to utilize commonly used sterile urine bag for specimen retrieval and instead of using morcellator, we used to divide the specimen into

small pieces inside the bag for easy retrieval. Retrieval is done through 12mm port which is usually extended and later on suture closed.

RESULTS

More than two thirds (69.9%) of the patients were female while 30% were male. Mean age was 26±11.50 years. Most common indication was ITP, followed by HS. Nearly half of the patients did not require any preoperative blood and platelet transfusions while one third of patients were transfused with both blood and platelets preoperatively. Intraoperative and postoperative complications occurred only in about 7.2% of patients.

Table-1: Indications for laparoscopic splenectomy

Indication	Frequency	Percentage
ITP	77	74.8
Hereditary spherocytosis	12	11.7
Cyst	9	8.7
Abscess	5	4.9
Total	103	100.0

Table-2: Preoperative transfusion of blood & Platelet

	Frequency (n)	Percentage
Only blood	15	14.6
Only platelets	10	9.7
Both blood & platelets	31	30.1
None	47	45.6
Total	103	100.0

Table-3: Intraoperative & Postoperative complications

	Frequency	Percentage
Intra-operative Bleeding	2	1.9
Pulmonary complications	3	2.9
Ileus	1	1.0
Wound infection	2	1.9
No complication	95	92.2
Total	103	100

DISCUSSION

Advancements in laparoscopy have reached a point that LS has become first choice in almost all kind of procedures that can be done with laparoscopy. In our case series, majority patients were female (2/3) as shown in other studies.[7,8] Our patients were younger with mean age of 26 years as shown in another study.[9] In other case series, patients are comparatively older.[6] This might depend upon the indications as in our study, majority were ITP and HS which are common in younger age groups.

Most common indication in our study was ITP. The same is shown in another study.[10] In ITP, spleen weight is comparatively smaller and can be easily done laparoscopically, though ideally spleen weight is not a contraindication for LS. Best treatment option is controversial for cysts in the spleen. Although total splenectomy is justifiable approach and we did the same. But there are some individual case studies in which excellent results were achieved with conservative approach such as aspiration, excision and partial splenectomy.[11,12] In our study, greater experience in advanced laparoscopy and proper case selection might be the reason for 0% conversion rate. Smaller splenic weight in majority of cases may be another reason. Studies done by Wang Y[13], Casaccia M[14] and Patel AG[10] have shown conversion rates of 2.4%, 5.8% and 8% respectively. One systemic review showed conversion rates ranging between 0–35%. This difference may be attributed to surgeon experience and spleen size and weight especially above 1000 grams.

As per protocols of anaesthesiology department of our hospital, platelet count needs to be above $50x10^9$/L for surgery in most of the cases. Due to this fact, preoperative transfusions are done in almost half of the cases in our study. In literature, many studies have shown safety of LS in the presence of low platelet count. Many studies[15–17] are done which states that it is safe and effective to operate on patients with platelet count as low as 10×10^9 /L without need for any platelet transfusion. In a systemic review, it is recommended that in the absence of any coagulopathy, LS can be carried out safely even when platelet count is low.[1]

Triple vaccination done in majority of the cases in our study as per hospital protocol and also being recommended in many studies.[18,19] It was done preoperatively most of the time, but in some case, it was completed postoperatively. Most of our patients belonged to younger age group, so they needed protection. In an Indian study, no meningococcal vaccine was given while influenza B vaccine was given to only half of the patients and 77% had pneumococcal vaccine.[9] In another study, 2/3 of the patients were vaccinated.[7] LS is safe procedure in experienced hands and postoperative complications were 8% in our study and they were managed without any permanent morbidity and no mortality. Varying percentages of postoperative complications are mentioned in the literature by Kojouri K[20], Wang Y[9] and Casaccia M[10] as 10%, 12% and 17%. A systemic review showed complication rates ranging between 0–35%. This wide range might be explained by several surgeon and patient related factors such as surgeon experience, comorbidities, massively enlarged spleen and preoperative platelet count.[1] Mortality was 0% in our study and generally it is very rare (0.3–0.4%) in LS.[14,18] Mean hospital stay 3 days while in literature, it ranges between 2–5 days.[10,14]

We utilized lateral approach in almost all of the cases and found it quite safe and robust. Most of the surgeons prefer this approach as it is quicker (60 vs. 80 min), safer (complications 4.8% vs 31.5%) and with fewer loss of blood (30 vs. 110 ml) as compared to anterior approach.[14] Decision of drain placement

depends upon the indication (splenic infected cyst or abscess), suspected pancreatic injury and in cases where there is larger raw surface area. We put drain in about 10% of the cases while Rehmani B put it in 21% of cases.[9] Due to the use of energy devices and taking proper vascular control, drain placement has become optional.

CONCLUSION

Laparoscopy is safe in the experienced hands and laparoscopy should be the first choice for all elective benign conditions of the spleen even in the developing world.

Recommendations / Suggestions:

Personal experiences should be shared so that it serves as motivation and a benchmark for the expertise so that to improve it further. Surgeons having advanced laparoscopic skills should take part in training residents and young surgeons. Long term follow-up studies needed to assess type and durability of the response of LS in haematological diseases.

ACKNOWLEDGEMENT

Technical staff of laparoscopy O.R. Residents of surgical "D" unit who scrubbed on the cases and helped in keeping record of the patients.

All the physicians and fellow surgeons who referred their patients to our unit.

AUTHORS' CONTRIBUTION ..

MAK: Conceptualization of study design, Data collection, Data Analysis, write-up. HK: Data Interpretation, Proof Reading. RU: Literature search, Data analysis. MZ: Data collection, Proof Reading

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Submitted: October 18, 2020	*Revised: --*	*Accepted: December 19, 2020*

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